

1. A process of propagating viewing assets to a system of video servers, comprising:

copying a missing portion of a replica of a selected viewing asset to a target video server in response to  
5 determining that a priority to propagate the selected asset to the target server is higher than a retention value of a replica of one or more viewing assets stored on the target server.

10 2. The process of claim 1, wherein the copying writes the missing portion of the replica of the selected asset onto a storage region of the target video server previously storing a portion of the replica of one or more viewing assets.

15 3. The process of claim 1, further comprising:  
selecting a portion of the replica of one or more viewing assets in response to the replica of one or more viewing assets having a data size at least as large as a data size of the missing portion of the selected asset.

20 4. The process of claim 1, wherein the copying the missing portion of the replica of a selected asset includes copying the missing portion from one or more video servers.

25 5. The process of claim 1, further comprising :  
assigning propagate priorities of a plurality of viewing assets;

ranking the viewing assets according to the assigned priorities; and

30 selecting the selected asset in response to the selected asset having more than a preselected minimum rank.

6. The process of claim 5, wherein the assigning includes determining the propagation priorities based at least in part on global priorities to propagate associated ones of the assets to target video servers.

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7. The process of claim 5, wherein the assigning includes determining local priorities to have replicas of associated assets on particular video servers, the local priorities depending on the states of the particular video servers.

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8. The process of claim 5, wherein the portion of replica of one or more viewing assets consists of replicas of asset elements belonging to one or more ELists.

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9. The process of claim 3, further comprising:  
updating retention values of replicas of viewing assets remaining on the target server in response to the copying.

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10. The process of claim 1, wherein the viewing assets include video files for at least one of movies, news emissions, and shopping emissions.

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11. The process of claim 1, wherein the replica of one or more viewing assets includes a replica of an asset element shared by replicas of two assets on the target server.

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12. A process for propagating digital viewing assets to video servers, comprising:  
assigning to each of a plurality of digital viewing assets a priority to propagate the asset onto video servers;  
ranking the assets based on the assigned priorities; and

propagating one of the assets to one or more selected video servers in response to the one of the assets having a preselected minimum ranking.

5           13. The process of claim 12, wherein the assigning includes:

          assigning a viewing asset to a usage class, the usage class providing a portion of an initial value for priorities to propagate assets assigned to the class.

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          14. The process of claim 13, further comprising:  
          accumulating usage data on individual assets stored on the video servers; and

          updating the priorities to propagate the assets based on  
15 the usage data.

          15. The process of claim 13, wherein the viewing assets include one of encoded digital video assets and encoded digital audio assets.

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          16. The process of claim 14, wherein the usage data includes numbers of viewer requests during predetermined periods and differences between numbers of viewer requests during earlier and later predetermined periods.

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          17. The process of claim 14, further comprising:

          updating the priority to propagate a particular asset in the usage class based on a difference between the usage level of the usage class and a usage level of the particular asset  
30 determined from the accumulated usage data.

          18. The process of claim 13, further comprising:

calculating the priority to propagate the one of the  
assets onto a particular video server from a global priority  
to propagate the one of the assets and a local priority to  
propagate a replica of the asset on the one of the selected  
5 video servers.

19. The process of claim 13, further comprising:  
streaming a replica of the copied one of the assets from  
the particular video server to a television of a viewer in  
10 response to receiving a request to view the asset from the  
viewer.

20. A process of propagating viewing assets to a video  
storage, comprising:  
15 assigning propagation priorities to viewing assets;  
constructing a table of element deletion lists for a  
target video storage;  
selecting a group of element deletion lists from the  
table, the group having a data size at least as large as a  
20 data size of a portion of a replica of another asset not  
stored on the target storage; and  
copying the portion of the replica of the another asset  
onto the target video storage in response to the propagation  
priority of the another asset being larger than a retention  
25 value of the group.

21. The process of claim 20, wherein the copying writes  
the portion onto a region of the target video storage  
previously storing the group.

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22. The process of claim 20, wherein the selecting a  
group includes constructing a table listing sets of element

deletion lists with lower retention value than the propagation priority of the another asset.

23. The process of claim 22, wherein the selecting  
5 includes picking one of the lists having a data size at least as large as the portion of the replica of the another asset.

24. The process of claim 20, further comprising:  
updating the table of element deletion lists in response  
10 to performing the copying.

25. The process of claim 20, wherein each element  
deletion list includes a set of replicas of asset elements  
that are shared by the same assets.  
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26. A process of distributing viewing assets to viewers,  
comprising:  
assigning priorities to assets, the priorities indicating  
priorities for distributing the associated assets to video  
20 servers accessible to viewers;  
selecting a video server; and  
copying one of the assets onto the video server in  
response to determining that the priority associated with the  
one of the assets is greater than a retention value associated  
25 with a set replicas of viewing assets stored on the video  
server, the replicas occupying enough space to store the one  
of the assets.

27. The process of claim 26, wherein the copying  
30 includes searching for one or more sets of replicas of asset  
elements to delete from a table of element deletion lists.

28. The process of claim 26, further comprising:  
updating the retention values in response to anticipated  
changes in viewer request levels for assets.

5 29. The process of claim 28, further comprising:  
accumulating data on usage of individual ones of the  
assets, the updating based at least in part on the accumulated  
data.

10 30. An interactive television system, comprising:  
one of a network and a bus;  
a plurality of video servers to store digital replicas of  
viewing assets for viewers, the video servers being connected  
by the one of a network and a bus; and  
15 a control unit connected to the video servers and  
configured to control copying of a missing portion of a  
replica of a selected asset to one of the video servers in  
response to a priority to propagate the selected asset onto  
the target server being higher than a value of retaining a  
20 replica of one or more other assets already stored on the one  
of the servers.

31. The system of claim 30, wherein the control unit is  
further configured to record usage data for the assets stored  
25 on each of the local video storages.

32. The system of claim 30, further comprising:  
a plurality of distribution networks to provide channels  
for delivering viewing assets to viewer televisions, each  
30 distribution network connected to portion of the video  
servers.

33. The system of claim 30, wherein the control unit is configured to accumulate usage data on viewing assets from the video servers.

5 34. A program storage media storing computer executable instructions for propagating viewing assets onto video storages, the instructions to cause the computer to:

order copying of a missing portion of a replica of a selected viewing asset to a target video server in response to  
10 determining that a priority to propagate the selected asset to the target server is higher than a retention value of a replica of one or more viewing assets stored on the target server.

15 35. The media of claim 34, the instructions further causing the computer to:

select a portion of the replica of one or more viewing assets in response to the replica of one or more viewing assets having a data size at least as large as a data size of  
20 the missing portion of the selected asset.

36. The media of claim 34, wherein the instructions to order copying of the missing portion of the replica of a selected asset cause the computer to control copying of the  
25 missing portion from one or more video servers.

37. The media of claim 34, the instructions further causing the computer to:

assign priorities to propagate to a plurality of viewing  
30 assets;

rank the viewing assets according to the assigned priorities; and

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select the selected asset in response to the selected asset having more than a preselected minimum rank.

38. The media of claim 37, wherein the instructions to  
5 assign cause the computer to:

determine the propagation priorities based at least in part on global priorities to propagate associated ones of the assets to target video servers.

10 39. The media of claim 37, wherein the portion of replica of one or more viewing assets consists of replicas of asset elements belonging to one or more ELists.

40. The media of claim 35, the instructions further  
15 causing the computer to:

update retention values of replicas of viewing assets remaining on the target server in response to the copying.

41. A program storage media storing executable  
20 instructions for propagating digital viewing assets onto video servers, the instructions causing a computer to:

assign to each of a plurality of digital viewing assets a priority to propagate the asset onto video servers;

rank the assets based on the assigned priorities; and

25 order propagation of one of the assets to one or more selected video servers in response to the one of the assets having a preselected minimum ranking.

42. The media of claim 41, wherein the instructions to  
30 assign cause the computer to:



assign a viewing asset to a usage class, the usage class providing a portion of an initial value for priorities to propagate assets assigned to the class.

5           43. The media of claim 42, the instructions further causing the computer to:

accumulate usage data on individual assets stored on the video servers; and

10           update the priorities to propagate the assets based on the usage data.

44. The media of claim 43, wherein the usage data includes numbers of viewer requests during predetermined periods and differences between numbers of viewer requests  
15 during earlier and later predetermined periods.

45. The media of claim 43, the instructions further causing the computer to:

20           update the priority to propagate a particular asset in the usage class based on a difference between the usage level of the usage class and a usage level of the particular asset determined from the accumulated usage data.

25           46. The media of claim 42, the instructions further causing the computer to:

calculate the priority to propagate the one of the assets onto a particular video server from a global priority to propagate the one of the assets and a local priority to propagate a replica of the asset on the one of the selected  
30 video servers.

47. A program storage media storing executable instructions for propagating viewing assets to a video storage, the instructions causing a computer to:

assign propagation priorities to viewing assets;

5       construct a table of element deletion lists for a target video storage;

10       select a group of element deletion lists from the table, the group having a data size at least as large as a data size of a portion of a replica of another asset not stored on the target storage; and

15       order copying of the portion of the replica of the another asset onto the target video storage in response to the propagation priority of the another asset being larger than a retention value of the group.

20       48. The media of claim 47, wherein the instructions to select a group cause the computer to construct a table listing sets of element deletion lists with lower retention value than the propagation priority of the another asset.

25       49. The media of claim 48, wherein the instructions to select cause the computer to pick one of the lists having a data size at least as large as the portion of the replica of the another asset.

30       50. The media of claim 47, wherein each element deletion list includes a set of replicas of asset elements that are shared by the same assets.

51. A process for propagating digital viewing assets to video servers, comprising:

propagating a plurality of viewing assets to video servers based on priorities to propagate, the priorities providing a ranking of the assets;

5 accumulating usage data on individual ones of the assets stored on the video servers; and  
updating the priorities based on the usage data.

52. The process of claim 51, further comprising:  
assigning a viewing asset to a usage class, the usage  
10 class providing a portion of an initial value for the priorities to propagate for the assets assigned to the class.

53. The process of claim 52, further comprising:  
calculating the priority to propagate a selected one of  
15 the assets onto one of the video servers from a global priority to propagate the selected one of the assets and a local priority to propagate a replica of the selected one of the assets onto the one of the video servers.

20 54. The process of claim 53, wherein the global priority is based in part on a counter value, the counter value measuring usage of the selected one of the assets.

55. The process of claim 53, wherein the local priority  
25 is based in part on a bandwidth for streaming the selected one of the assets from the one of the video servers to a set of viewers.

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